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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/710,895

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Boris A. Movchan

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EXAMINER

SMITH, FRANCIS P

ART UNIT

PAPER NUMBER

1792

NOTIFICATION DATE

DELIVERY MODE

07/20/2009

ELECTRONIC

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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<b>Office Action Summary</b>	<b>Application No.</b> 10/710,895	<b>Applicant(s)</b> MOVCHAN ET AL.	
	<b>Examiner</b> Francis P. Smith	<b>Art Unit</b> 1792	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 11 August 2004.
- 2a) ☒ This action is **FINAL**.                      2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 11-14 and 17-20 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 11-14 and 17-20 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |                                                                                        |                                                                   |
|----------------------------------------------------------------------------------------|-------------------------------------------------------------------|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)                       | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)   | Paper No(s)/Mail Date. _____                                      |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>5/21/2009</u> .                                               | 6) <input type="checkbox"/> Other: _____                          |

## **DETAILED ACTION**

### ***Response to Arguments***

1. Applicants' arguments, see remarks, filed April 8, 2009, with respect to the rejection(s) of claim(s) 11-15 and 17-20 have been fully considered and are not persuasive. The submitted declaration is drawn to claims 26-40 of the parent application, not the claims of the instant application. Therefore, the rejection has been maintained.

Applicants amend claim 11 to incorporate the limitations of claim 15 in order to overcome the rejections of the previous office action. However, this is not found persuasive since Rigney/Allen teach substantially the same processing steps, and thus, would inherently create a thermal barrier coating wherein the pores containing the carbon-containing gas are resistant to sintering, grain coarsening, and pore redistribution. Furthermore, it is axiomatic that one who performs the steps of a process must necessarily produce all of its advantages and the mere recitation of a newly discovered property that is inherently possessed by the steps in the prior art does not cause a claim drawn to those steps to distinguish over the prior art.

Claim 11 is currently amended, claims 1-10, 15, 16, and 21-25 are canceled. Claims 11-14 and 17-20 are currently pending and examined on the merits.

### ***Claim Rejections - 35 USC § 102***

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

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A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

3. Claims 11 and 17-20 are rejected under 35 U.S.C. 102(e) as being anticipated by Rigney et al. (US 6,492,038B1).

The applied reference has a common assignee with the instant application. Based upon the earlier effective U.S. filing date of the reference, it constitutes prior art under 35 U.S.C. 102(e). This rejection under 35 U.S.C. 102(e) might be overcome either by a showing under 37 CFR 1.132 that any invention disclosed but not claimed in the reference was derived from the inventor of this application and is thus not the invention “by another,” or by an appropriate showing under 37 CFR 1.131.

For claim 11, Rigney teaches a thermal barrier coating (TBC) and a method for forming the coating on a component intended for use in a hostile environment comprising:

forming the thermal barrier coating via high-temperature evaporation of the TBC material in the presence of the carbon and/or nitrogen-containing gas(es) whereby the TBC ingot could be altered to contain carbon (i.e. elemental carbon), a carbon-containing compound, or a carbide, or a nitride (i.e. co-evaporating carbon and a thermal-insulating material at an elevated temperature) (col. 5, lines 45-50 and 55-58). The materials are deposited so as to anchor and pin the grain boundaries and pores of the TBC (i.e. depositing elemental carbon in pores that are within grains and at and

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between grain boundaries of the thermal-insulating material, the pores establishing an open porosity within the thermal barrier coating) (col. 4, lines 51-67);

and partially sintering the thermal barrier coating during a subsequent high temperature excursion/treatment to evolve a carbon-containing gas from at least some of the elemental carbon and then close at least some of the pores to entrap the carbon-containing gas within the closed pores, the elemental carbon and/or carbon-containing gas being present in an amount sufficient to thermally stabilize the microstructure of the thermal insulating material (col. 6, lines 4-20). The heat treatment at temperatures of 900-1150°C will inherently cause partial sintering to evolve a carbon containing gas from at least some of the elemental carbon and then close at least some of the pores to entrap the carbon-containing gas within the closed pores, the elemental carbon and/or the insoluble gas being present in an amount sufficient to thermally stabilize the microstructure of the thermal-insulating material (i.e. the pores containing the carbon-containing gas are resistant to sintering, grain coarsening, and pore redistribution, as per claim 15) (col. 6, lines 4-20).

Furthermore, by sufficiently stabilizing the barrier layer via heat treatment, the TBC microstructure can **subsequently** be heated to temperatures in excess of 1200°C (i.e. pores containing carbon containing gas as a result of said heat treatment are resistant to sintering, grain coarsening, and pore redistribution) (col. 3, lines 23-30; col. 6, lines 4-20).

Claim 17, the heat/sintering step is conducted at a temperature of at least 950°C. (col. 6, lines 11-13).

Claim 18, the heat/sintering conducted in the presence of a carbon-containing gas will inherently form additional pores that entrap said carbon containing gas (col. 6, lines 4-20).

Claim 19, the heat/sintering step is conducted at a temperature of at least 950°C. (col. 6, lines 11-13).

For claim 20, Rigney teaches a TBC containing columnar grains and a preferred insulating material is yttria-stabilized zirconia (col. 4, lines 25-30 and 36-37).

4. Claims 11 and 14 are rejected under 35 U.S.C. 102(e) as being anticipated by Allen et al. (US 6,835,465 B2).

Allen teaches a process of producing a thermal barrier layer comprising:

forming the thermal barrier coating at an elevated temperature (e.g. via flame spraying, EB-PVD, etc) by co-evaporating carbon and a thermal-insulating material to deposit elemental carbon in pores (i.e. that are within grains and at and between grain boundaries of the thermal insulating material, the pores establishing an open porosity within the thermal barrier coating (col. 9, lines 1-21, 44-57; col. 10, lines 56-60); and

partially sintering the thermal barrier coating to evolve a carbon-containing gas from at least some of the elemental carbon and then close at least some of the pores to entrap the carbon-containing gas within the closed pores, the elemental carbon and/or carbon containing gas being present in an amount sufficient to thermally stabilize the microstructure of the thermal insulating material (col. 8, line 53-col. 9, line 6, 44-57).

Regarding the claim amendment, since Allen teaches substantially the same

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processing steps as Applicants, the pores containing the carbon-containing gas are inherently resistant to sintering, grain coarsening, and pore redistribution.

For claim 14, Allen teaches an open porosity in the thermal barrier coating that constitutes at least 25 volume percent of the thermal barrier coating (col. 9, lines 44-46).

### ***Claim Rejections - 35 USC § 103***

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

7. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to

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consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

8. Claims 12 and 13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Allen et al. (US 6,835,465 B2) as applied to claim 11 above, in view of Alperine et al. (US 6,312,832 B1).

Allen teaches depositing a thermal barrier coating by electron beam vapor deposition during which a thermal-insulating material and a carbon-containing (graphite material as per claim 13) material are simultaneously evaporated (col. 9, lines 1-21; col. 10, lines 56-60). Although Allen does not expressly state the precursor materials were in the form of ingots, it was well known in the art at the time of the invention to utilize source materials in the form of ingots for evaporation in EB-PVD processes (see Alperine as evidence: col. 4, lines 42-51).

### ***Conclusion***

9. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any



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extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Francis P. Smith whose telephone number is (571) 270-3717. The examiner can normally be reached on Monday through Thursday 7:00 AM-5:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mikhail Kornakov can be reached on (571) 272-1303. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/F. P. S./

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Examiner, Art Unit 1792

/Michael Kornakov/

Supervisory Patent Examiner, Art Unit 1792